

Develop Computerized Patient Simulation Modules to Enhance
Learning of Therapeutic Modalities

Teaching Grant Proposal

2009 - 2010

Abstract

Therapeutic Modalities (TM) such as ultrasound, electrical muscle stimulation, iontophoresis and traction are used by athletic trainers to promote recovery from injury. All junior athletic training students take *Sports Medicine Treatment Modalities and Laboratory* (ATEP 3250/ 3251); these courses provide the instruction and clinical skills necessary to apply TMs to treat pain, swelling, increase muscle strength and tissue healing. Teaching TM can be challenging since application methods change based upon the injury stage (acute, subacute, and chronic), severity, location, patient response and TM unit available. Providing students sufficient practice opportunities during class and laboratory is difficult due to time constraints and material volume. This project will provide students supplemental practice opportunities by developing four computerize patient simulation modules located on Blackboard. All modules will begin with an injury scenario, followed by a question labyrinth that includes a minimum of ten evaluation or treatment steps that the student works through. Module effectiveness will be evaluated by peer review, student questionnaire and oral practical exams. Improved material comprehension and confidence in making clinical treatment decisions is expected to be achieved by the athletic training students after completion of these modules.

Purpose/Objective

Therapeutic Modalities (TM) such as ultrasound, electrical muscle stimulation, iontophoresis and traction are used by athletic trainers to promote recovery from injury. When applied properly TM can effectively reduce pain and heal injured tissues, while improper application may prove ineffective or may actually cause patients harm. To learn how to apply TMs, all athletic training students (ATS) are required to take *Sports Medicine Treatment Modalities (ATEP 3250) and Laboratory (ATEP 3251)*. The lecture (ATEP 3250) presents detailed information on TM's indications and contraindications; physiological effects; clinical application; and treatment plan development. The laboratory (ATEP 3251) provides students hands-on experience applying TMs to reduce pain and swelling, increase muscle strength; improve range of motion/flexibility, and promote tissue healing. Helping students develop proficiency in using TMs is a challenge because they are located in health care facilities and hence students have limited practice opportunities outside ATEP 3251 and a clinical rotation in the athletic training room. To enhance student learning, the purpose of this project is to develop computerized patient simulation modules that use TM. These modules will develop students higher order thinking skills by providing them the opportunity to practice TM selection based on their assessment of a patient's presenting information (e.g., signs and symptoms) as well as developing the appropriate clinical application and treatment course in response to various injuries. These modules will supplement materials learned in lecture/lab with a goal of improved comprehension and confidence in making clinical decisions.

Project Description (Approach/Method/Procedure)

Athletic training students enrolled in ATEP 3250/51 will be assigned four computerized patient simulation modules, each module covering two or more therapeutic modalities. The

instructor will develop a question labyrinth for each injury scenario during SS#1. These question labyrinths will then be inputted by the instructor into modules housed in Blackboard, using a combination of multi-select, drag and drop, animated simulations, hot spots and video clips.

Once the therapeutic modality unit(s) is covered in lecture and laboratory, students will be assigned the corresponding module on Blackboard. The initial scene will provide background information describing the mechanism of injury, chief complaint, signs, symptoms and pertinent medical history. The students' response to the initial scene will determine the computer's response. If the selection is accurate, the program will lead to student to the next evaluation or treatment step. If the selection is inappropriate, the program will show the student the consequences of his/her action and then lead to the next evaluation or treatment step. This process of providing computer generated feedback on student decisions will continue until the student has completed all of the steps in treatment, each module will have a minimum of ten (10) evaluation or treatment steps. Each module will have specific completion due dates. Once the module has been completed for class, the students will be able to re-visit the module(s) for additional practice opportunities throughout the semester.

Need and Impact

The athletic training education accrediting organization (CAATE) stipulates that athletic training students (ATS) must show proficiency in the ability to plan, implement, document, and evaluate TM efficacy in treating injuries. All junior ATS (n= 10 to 20) take *Sports Medicine Treatment Modalities and Sports Medicine Treatment Modalities Laboratory* (ATEP 3250/3251) concurrently during the fall semester. After fifteen years of teaching these courses, the number one student request has been for additional practice opportunities deciding which TM to use and application procedures to follow for various injury situations. ATS find designing treatment

protocols frustrating since options are not black or white, but change depending on injury severity, location, tissue healing stage, and patient response. Hence, including practice patient simulation modules into the courses will address this need.

Additionally, the national athletic training certification exam changed from a multiple choice and oral practical exam to an exclusively computerized exam format in June 2007. The current format has replaced the oral practical portion with patient simulation modules. Recent program graduates who completed this computer format stated they did not feel well prepared for the simulation modules. Incorporating patient simulation modules into ATEP 3250/3251 should make the testing format more familiar and improve certification exam outcomes.

Schedule of Activities and their Proposed Deadlines

- Weeks 1-2 Organize and write question labyrinths for the patient simulation modules.
Developing the detailed question labyrinth will be the most time consuming aspect of the project. All modules will include a minimum of ten evaluation or treatment steps and two or more therapeutic modalities.
- Week's 2-3 Question labyrinths will be inputted into computer program on Blackboard
- Week 4 Modules will be evaluated by two peer athletic training clinical instructors
- Week 5 Make suggested changes and finalize project.
- Fall 2009 Incorporate modules into ATEP 3250/3251 which will be continued to be revised and used in subsequent years.

Evaluation plan

The patient simulation modules will be evaluated via three different methods. First, once the modules are completed during SS#1, two peer athletic training clinical instructors have

agreed to review the modules. The instructor will address the suggestions and adjust the modules accordingly prior to fall 2009.

Second, as students finish each assigned module in fall 2009, they will be asked to complete the following questions on a scale from 1 to 10 in effort to evaluate each module's effectiveness. Additionally they will provide rationale as to why they selected that number and also what could be done to get to a higher number.

1. The patient simulation modules instructions and initial case scenario were clear.
2. Your TM knowledge was enriched by completing the module.
3. The module assisted your ability to practice creating treatment protocols?

The third form of evaluation will involve an objective assessment of student's performance on oral practical exams. Currently students take four oral practical exams covering each TM (ultrasound, neuromuscular electrical stimulators, iontophoresis, and traction) throughout the semester. The instructor presents various injury scenarios during the oral practical exam and the student must decide which TM to select and the proper application procedure. Material mastery must be demonstrated by receiving a minimum of 85% on each TM, if an 85% is not obtained the student repeats the oral practical exam until mastery is achieved. Given that the knowledge domain assessed by the oral exam is similar to that developed by the modules; the modules' effectiveness can also be evaluated by noting an improved oral practical exam first time pass rate after completing the modules compared to student scores in previous years that did not have the modules available to them.

Budget

Additional funding outside of summer stipend is not requested

Appendices

(a) Courses taught

Semester	Course
Fall	Sports Medicine Treatment Modalities (ATEP 3250)
Fall	Sports Medicine Treatment Modalities Laboratory (ATEP 3251)
Fall	Sports Medicine Practicum I (ATEP 6040)
Fall	Sports Medicine Practicum II (ATEP 6042)
Fall and Spring	Clinical Experience in Athletic Training (ATEP 3271)
Fall and Spring	Field Experience in Athletic Training (ATEP 4300)
Fall and Spring	Medical Nomenclature for Human Performance (ATEP 2800)
Spring	Pathology and General Medicine (ATEP 3270)
Spring	Principles of Athletic Training (ATEP 2810)
Spring	Principles of Athletic Training Laboratory (ATEP 2811)

Scholarly interests include utilizing therapeutic modalities for injury resolution and develop educational techniques to assist student learning of therapeutic modalities.

(b) No previous grants submitted

(c) n/a

(d) n/a